

Claims

1. A battery separator, comprising:

a polymer web having first and second major surfaces and including an ultrahigh molecular weight polyolefin of a molecular weight that provides sufficient molecular chain entanglement to impart high-strength mechanical properties to the polymer web and a silica component that facilitates separator wettability; and

an antioxidant material present on at least one of the first and second major web surfaces to suppress polyolefin degradation.

2. The battery separator of claim 1, in which the antioxidant material includes (tetrakis[methylene(3,5-di-tert-butyl-4-hydroxyhydrocinnamate] methane).

3. The battery separator of claim 1, in which the antioxidant material is present on both of the first and second major web surfaces.

4. The battery separator of claim 1, in which the polymer web includes an interior portion between the first and second major surfaces, and in which a portion of the antioxidant material is present in the interior portion.

5. The battery separator of claim 1, in which the antioxidant material present on the first major surface of the polymer web is applied by a method selected from the group consisting essentially of brushing, spraying, immersion, and roller-based application.

6. The battery separator of claim 1, in which the first major surface of the polymer web is positioned adjacent an electrode structure to form a battery assembly into which is placed an electrolyte that is at least partly absorbed by the electrode structure.